

5    What is Claimed is:

1. An index head in a semiconductor device test handler, for holding semiconductor devices, and mounting/dismounting to/from test sockets comprising:

        a carrier base fixedly fitted to a transfer device movable in any direction;

        an elevating carrier coupled to the carrier base to be movable in up and down  
10    directions;

        elevating means for moving the elevating carrier in up and down directions with respect to the carrier base;

        a head holder under the elevating carrier coupled to the elevating carrier via a guide member for making relative movement with respect to the elevating carrier in up and down directions; and,

        a plurality of heads each including;

        a holding part fixedly fitted to a bottom of the head holder for holding the semiconductor device by vacuum,

        a heating part on top of the holding part for transfer of a heat to the semiconductor  
20    device directly when the semiconductor device is mounted in the test socket, and

        a compliance part fitted over the heating part for providing degrees of freedom for an alignment between the semiconductor device held by the holding part and the test socket.

2. An index head as claimed in claim 1, further comprising a force transducer  
25    between the elevating carrier and the head holder for automatic measurement of a load applied by the elevating carrier in proportion to displacement of the elevating carrier with respect to the head holder when the semiconductor device mounted in the test socket is pressed down.

3. An index head as claimed in claim 2, wherein the force transducer is a load cell.

4. An index head as claimed in claim 1, wherein the guide members are guide pins on opposite side parts of a top part of the head holder for being inserted, and coupled to corresponding holes in the elevating carrier to be movable in up and down directions.

5. An index head as claimed in claim 1, wherein the guide member includes one pair of LM guides fitted to the elevating carrier in up and down directions, and LM blocks fixed to a rear surface of the head holder and coupled to the LM guides.

6. An index head as claimed in claim 1, wherein the compliance part in the head includes;

an upper block fixedly fitted to the head holder having a plurality of holes in a bottom surface thereof,

ball plungers each having an elastic body inserted, and retained in the hole in the upper block, a retainer coupled to a lower end of the elastic body, and a ball retained under the retainer and exposed outside of the bottom surface of the upper block,

a lower block coupled to a bottom part of the upper block with a preset allowance, and

ball buttons of recesses in an upper surface of the lower block at positions in correspondence to the holes in the upper block for receiving and holding the balls of the ball plungers.

5           7. An index head as claimed in claim 1, wherein the heating part includes;  
a heating block of a conductive material having a built-in electric heater for  
generating, and transfer of a heat to the holding part under the heating block,  
a through hole in a central part of the heating block, and  
a coupling nozzle passed through, and fixed to the through hole for evacuation of air  
10 to form a vacuum therein, and is coupled with the compliance part with a spaced away  
therefrom.

8. An index head as claimed in claim 7, wherein a lower end of the coupling nozzle is  
formed of an elastic material for having flexibility.

9. An index head as claimed in claim 8, wherein a lower end of the coupling nozzle is  
formed of silicone.

10. An index head as claimed in claim 1, wherein the holding part for holding the  
20 semiconductor device includes;

a pocket block of a conductive material for close contact coupling with a bottom  
surface of the heating block in the heating part,

a through hole in a center part of the pocket block,

a floating nozzle inserted in, and coupled to the through hole to be connected to the  
25 coupling nozzle in the heating part for adsorbing and holding the semiconductor device by  
vacuum, and

a plurality of blades of a non-conductive material vertical to a bottom surface of the  
pocket block for pressing leads of the semiconductor device held by the floating nozzle to

5 bring into contact with terminal part of the test socket.

11. An index head as claimed in claim 7, wherein the holding part for holding the semiconductor device includes;

10 a pocket block of a conductive material for close contact coupling with a bottom surface of the heating block in the heating part,

a through hole in a center part of the pocket block,

a floating nozzle inserted in, and coupled to the through hole to be connected to the coupling nozzle in the heating part for adsorbing and holding the semiconductor device by vacuum, and

a plurality of blades of a non-conductive material vertical to a bottom surface of the pocket block for pressing leads of the semiconductor device held by the floating nozzle to bring into contact with terminal part of the test socket.

20 12. An index head as claimed in claim 10, wherein the floating nozzle is coupled to the through hole so as to allow a free movement in up and down directions for a preset distance.

25 13. An index head as claimed in claim 12, wherein the through hole in the pocket block has steps at an upper part and a lower part of the through hole respectively to have diameters greater than an intermediate part thereof, and the floating nozzle has rims extended outward from an upper part and a lower part of the floating nozzle for limiting movement of the floating nozzle by the upper and lower steps when the floating nozzle moves in up and down directions.

14. An index head as claimed in claim 1, further comprising positioning pins in the vicinity of the test socket, and positioning holes in the holding part for inserting the positioning pins, for accurate guide of the head onto the test socket when the head holds the semiconductor device and mounts in the test socket.

15. An index head as claimed in claim 1, wherein the elevating means includes;  
an LM guide fitted to the carrier base,  
an LM block fitted to the elevating carrier and coupled to the LM guide,  
a ball screw fitted to the carrier base and coupled to the elevating carrier, and  
an electric motor for rotating the ball screw.